the size of the subscribing undertakings, is sufficiently large to ensure that the association, if successful, will have ample funds at its disposal.

It is generally admitted that much remains to be done to bring about closer co-operation between science and industry, and it is therefore satisfactory to note that the new association proposes to arrange systematic conferences between manufacturers and teachers, at which the methods of teaching and the production of the particular type of trained man which manufacturers desire for their laboratories and works can be discussed.

PRINCE BORIS GALITZINE, For.Mem.R.S.

PRINCE BORIS BORISOVITCH GALITZINE died at Petrograd, after a short illness, on May 4/17 of this year, at the early age of fifty-four years. At the time of his death he was director of the meteorological service of the Russian Empire, which has its centre, in the winter, at the Nicholas Central Observatory, Petrograd, and, in the summer, at the Constantine Observatory at Pavlovsk, about twenty miles away. For that appointment he was chosen by the Imperial Academy in succession to Lieut.-General Rykatcheff, who retired in 1913 after many years' service.

Before his appointment he was a member of the Academy, to which he was appointed in 1894, sometimes acting as secretary, a professor in the University of Petrograd, and in charge of the seismological station at Pulkovo, which had been initiated by him, with the co-operation of Prof. Backlund, in November, 1906.

Born at Petrograd on February 18, 1862 (O.S.), Prince Galitzine was brought up at first abroad, and spent the eight years, 1880-1887, as a naval officer; he graduated in philosophy at Strasburg in 1890, and became Privatdocent in Moscow, and afterwards professor of physics in Jurjef, before his promotion to Petrograd in 1893. His earlier scientific papers were chiefly on the properties of gases and liquids, and the critical state, but his work covered also other branches of general physics. So early as 1887 he published, with General Rykatcheff, a handbook of meteorology, and later he organised, carried out, and reported upon the observation of clouds and other meteorological and hydrographical observations of the expedition of the Imperial Academy of Sciences to Nova Zembla in 1896.

He is, however, best known for his work in seismology, in which department of science he was a distinguished leader. He was elected president of the International Seismological Association at the meeting at Manchester in 1912. He designed the instruments which go by his name, and which are recognised as giving records specially adapted for the analysis of the various displacements of the solid earth, transmitted in the form of earthquake waves from one point to another of the globe.

A complete set of instruments of this type was presented by Prof. Schuster to the observatory at Eskdalemuir—the pair of horizontal recorders in 1911, and the vertical recorder in 1912. Prince Galitzine came to England with his wife in 1911, and made use of the opportunity to visit Eskdalemuir and supervise the erection of the horizontal pendulums there. Thereafter he took a paternal interest in the observatory. He visited it again at the time of the meeting of the International Association in 1912, and in the same year he gave a remarkable address to the meeting of the International Mathematical Association at Cambridge.

He received the degree of Sc.D. from the University of Manchester in 1911, and was only recently elected a foreign member of the Royal Society. His untimely death will be felt as a great loss by all who are interested in meteorological and geophysical subjects. His genius was undoubted. His energy and goodwill inspired confidence and commanded success.

NAPIER SHAW.

NOTES.

We notice with very deep regret the announcement that Prof. E. Metchnikoff, foreign member of the Royal Society, died at the Pasteur Institute, Paris, on July 15, at seventy-one years of age.

The death of Mrs. McKenny Hughes, wife of the Woodwardian Professor of Geology in the University of Cambridge, which occurred on the 9th of this month, will be widely regretted. She was the constant companion of her husband in his geological expeditions, not only in Great Britain, but also so far as to the Caucasus and western America, which they visited after meetings of the Geological Congress in Russia and in the United States. She took a keen interest in natural history, was a lover of flowers, especially the Alpine kinds, as was shown by the charming garden at their house in Cambridge, and had great artistic tastes, sketching admirably in water-colours. Sharing her husband's interests in geology and archæology, she joined him in writing the volume on Cambridgeshire in the "Cambridge County Geographies," and her hand may be seen in two drawings illustrating his paper on the Cae Gwyn cave in the forty-fourth volume of the Geological Society's Quarterly Journal. She made the mollusca, recent and subfossil, her special study, determining those found in that cave, and contributing an excellent paper on the subfossil contents of some Cambridgeshire gravels to the *Geological Magazine* for 1888. Her death takes away from Cambridge a lady of rare attractiveness and most valuable as a social influence, for she never flagged in helping her husband to make young geologists feel, as they passed through the University, that, great as was her love for the inmates of her home, she could yet find a place for them.

Economics has suffered a serious loss in the death of Capt. W. J. Mason, who was killed in action on July 3. Although only twenty-seven years of age, Capt. Mason, without contributing to the literature of economics, was making his influence felt, both as a lecturer and as a member of that rising school of economists which is devoting its attention to the social aspects and living problems of the science. Capt. Mason, whose experience was unusually wide, having been an examiner in the Exchequer and Audit Department, after a distinguished academic career at the London School of Economics, where he obtained both the Gerstenberg scholarship in 1911 and the

Gladstone prize, held for a time the position of tutor under the Workers' Educational Association, and afterwards accepted a lectureship at the University of Bristol, where he found that combination of learning and industrialism which naturally appealed to a man of his inclinations and ability.

THE issue of *Science* for June 23 last publishes the text of a Bill introduced by Mr. Newlands last March in the Senate of the United States, the object of which is to establish engineering experiment stations in the State colleges of the United States. The Bill was read twice, and has been referred to the Committee of the Senate on Agriculture and Forestry. The Committee of One Hundred on Scientific Research of the American Association for the Advancement of Science has passed a resolution recommending the passage of the Bill, and emphasising the untold value to American agriculture of the similar agricultural experiment stations already established by the State in connection with the colleges. The Bill provides that "in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with engineering and the other branches of the mechanic arts, and to promote the scientific investigation and experiment respecting the principles and applications of the mechanic arts," there shall be established under the direction of the State college in each State a department to be known as an "engineering" or a "mechanic arts" experiment station. The Bill provides also for a grant of 3000*l*. a year to each State for the purposes of such an experiment station. It is worthy of note in this connection that, according to the *Scientific Monthly*, these State, or land grant, colleges and the institutions of which they are a part received in 1914, from the United States, 500,000*l*.; from the States and from other sources, more than 6,000,000*l*. They have 9000 instructors and 105,000 students.

ANOTHER attempt is being made to rescue the stranded Antarctic explorers on Elephant Island. Last week Sir Ernest Shackleton left Punta Arenas in an auxiliary motor schooner of 70 tons, placed at his disposal by the British settlers in the Magellan Straits. The vessel was to be towed south so far as possible by a steamer lent by the Chilian Government. The prospects of a rescue are considerably better than in the attempt made in the *Instituto Pesca*, for the *Emma* is a wooden vessel, and so better suited for the work. Moreover, the probability of open water up to Elephant Island is greater this month than last, when the ice conditions were exceptionally severe. There is, however, a possibility of failure, for the vessel has not power to force her way into pack-ice, and as no time must be lost in effecting a rescue of Wild and his men, arrangements have been made by the British Government to dispatch a relief ship from this country without further delay. Meanwhile, the *Aurora* is being repaired by the New Zealand Government, and will leave Dunedin in December under the command of Mr. Stenhouse, her first officer, to fetch Mackintosh and his party at Cape Royds. There is no likelihood that the *Aurora* will find any difficulty in penetrating the Ross Sea, or that the men at Cape Royds are in serious straits.

THE Athens correspondent of the *Times* reports that a decree has been published whereby from 4 a.m. on July 28 Greece will adopt East European time, and will thus be two hours in advance of Greenwich mean time, and one hour in advance of Summer Time.

THE *Indian Forester* records with great regret the death in action (in Flanders) of 2nd Lieut. G. R. Jeffery, deputy conservator of forests, Burma. We learn that Mr. Jeffery was born on December 12, 1880, educated at Coopers Hill, and joined the Imperial Forest Service in 1902. He was a man of high ability and professional knowledge, and his death will be a serious loss to the Forest Department.

ON August 24–26 the third annual conference of the Society for Practical Astronomy will be held at the Bausch and Lomb Observatory in Rochester, N.Y. The president of the society, Mr. L. J. Wilson, extends the invitation to the meeting to all who are interested in astronomy. The observatory at which the meeting will be held is equipped with an 11-in. refractor constructed by the Bausch and Lomb Optical Company.

DR. J. C. TELLO, Mr. G. K. Noble, and Dr. L. S. Moss have left New York on a South American expedition on behalf of the Harvard Museum of Comparative Anatomy. Arriving at Paita, in Peru, they will travel on mules across the Andes and into the Amazon Valley, where they hope to collect zoological specimens and to study the tribe of Guanani Indians.

AN important ethnological expedition is about to be undertaken by Dr. R. H. Lowie, of the American Museum of Natural History. He will visit, first, the Crow Reservation in southern Montana, where he hopes to secure a thorough-going account of the war customs of the tribe and to complete a collection of myths and folk-tales. After spending a short time with the Arapaho, of Wind River, Wyoming, in order to re-examine their ceremonial organisations, Dr. Lowie will proceed to northern Arizona, where an investigation of certain problems connected with the Hopi will be carried out in considerable detail. The main points of inquiry will be the character and functions of the Hopi medicine-man, and the nature of the religious feelings underlying the ceremonial performances already noted by previous observers.

THE President of the Board of Agriculture and Fisheries has appointed Mr. Richard Brown, Walton Bank, Eccleshall, Staffordshire, to be a member of the Agricultural Consultative Committee.

THE wireless station on Dickson Island was to have been dismantled, but thanks to the timely and enlightened intervention of the Russian Naval Ministry, which is providing the necessary funds, its existence is saved, and it will be able to carry on work, not only of great scientific value, but also of practical utility for Arctic navigation, which is just now of special importance for Russia.

THE Prime Minister has appointed a Committee to consider the commercial and industrial policy to be adopted after the war, with special reference to the conclusions reached at the Economic Conference of the Allies, and to the following questions:—(*a*) What industries are essential to the future safety of the nation; and what steps should be taken to maintain or establish them. (*b*) What steps should be taken to recover home and foreign trade lost during the war, and to secure new markets. (*c*) To what extent and by what means the resources of the Empire should and can be developed. (*d*) To what extent and by what means the sources of supply within the Empire can be prevented from falling under foreign control. The Committee is composed as follows:—The Right Hon. Lord Balfour of Burleigh, K.T., G.C.M.G. (chairman), Mr. Arthur Balfour, Mr. H. Gosling, Mr. W. A. S. Hewins, M.P., Mr. A. H. Illingworth, M.P., Sir J. P. Maclay, Bt., the Right Hon. Sir A. Mond, Bt., M.P., Mr. Arthur Pease, Mr. R. E. Prothero, M.P., Sir Frederick H. Smith, Bt., Mr. G. J. Wardle, M.P., together with the following gentlemen, who are presiding over the Board of Trade Committees on the position of important industries after the war:—Sir H. Birchenough, K.C.M.G., Lord Faringdon, Sir C. G. Hyde, the Hon. Sir C. A. Parsons, K.C.B., F.R.S., Lord Rhondda, and Mr. G. Scoby-Smith. Mr. Percy Ashley, of the Board of Trade, and Mr. G. C. Upcott, of the Treasury, have been appointed secretaries to the Committee.

FOR the first half of the present summer there has been a complete absence of seasonable weather, the conditions continuing most persistently dull, damp, and cool. The weather reports from the health resorts issued each day by the Meteorological Office scarcely show a temperature of 70° at any of the English stations. Very little sunshine has been registered, although the amounts are somewhat erratic, but the sun's rays have had little effect in raising the shade temperature. Since the commencement of the summer the amount of the rainfall is given separately for night and day, a matter of considerable interest, both scientifically and to the general public. Records are published from rather more than thirty English health resorts, but the June values are only complete for every day throughout the month from six stations. The night observations are covered by the Summer Time hours from 5 p.m. to 9 a.m., a period of sixteen hours, and the day from 9 a.m. to 5 p.m., a period of eight hours, so that the night period is double the length of the day. Notwithstanding that the day is only one-half the duration of the night the rainfall for the day is more than that for the night at all the six stations, except at Ramsgate, where it is only 32 per cent. of the total fall. At Felixstowe the day fall is 64 per cent. of the total; in London it is 62 per cent.; at Harrogate 61 per cent.; Worthing 59 per cent.; and at Leamington Spa 51 per cent. of the total rainfall. This great excess during the day is abnormal.

THE names Hurter and Driffield (more familiarly "H. and D.") will be remembered as long as photography is studied, on account of the results of many years' work which they published about twenty-six years ago. Dr. Hurter, a Swiss, was the chief chemist, and Mr. Driffield the engineer, at Messrs. Gaskell, Deacon and Co.'s, of Widnes, now the United Alkali Company, and in their spare time they worked together on some of the fundamental problems connected with photography with such success that their names will always be associated with the subjects that they investigated. Their methods of expressing the character of negatives and of estimating the sensitiveness of photographic plates, of which the present "H. and D. numbers" are living examples, form an important section of their work. The recent death of Mr. Driffield, seventeen years after the death of Dr. Hurter, has given rise to a strong desire to commemorate their work done in the advancement of photography. A committee of the Royal Photographic Society is therefore arranging a scheme to this end, and it is asking for subscriptions for the purposes of: (1) The endowment of an annual Hurter and Driffield memorial lecture. (2) The publication in book form of their most important writings, together with desirable but hitherto unpublished matter. (3) Providing suitable accommodation in the house of the Royal Photographic Society for the original apparatus, together with MSS., notebooks, correspondence, etc., all of which have been bequeathed to the society by Mr. Driffield and handed over to it by his executors. Several generous donations have already been acknowledged by the hon. treasurer, Mr. W. B. Ferguson, K.C., 48 Compayne Gardens, South Hampstead, N.W.

IN the Journal of the College of Science, Imperial University of Tokyo, for October, 1915, which has only recently been received, Mr. R. Torii publishes an elaborate article on the prehistoric population of Southern Manchuria. This paper, well furnished with photographs, describes a population of hunters and fishermen, who seem to have very slowly gained a knowledge of iron and were practically in the age of stone. The discoveries of flint implements were exceedingly numerous. The pottery with its decoration in encrusted nodules of clay, and often coloured in red, is particularly interesting. The clothing of these people consisted of skins with some textiles made of hemp and other fibres. In the kitchen middens in the neighbourhood of Port Arthur some decorative objects made of bronze, iron, and jade, probably imported, were found. Southern Manchuria offers a practically unworked field for archæological work, and the Japanese scholars who have undertaken the work of exploration may be trusted to make the best use of this favourable opportunity.

A GOOD illustration of the direct relation which obtains between the play of animals and the vital activities of life, such as the capture of agile prey, the avoidance of their most formidable enemies, or conflict with rivals, is furnished by Mr. C. J. Carroll in the *Irish Naturalist* for May. Herein he describes the behaviour of the raven when attacked by the peregrine. On such occasions every effort is made to escape by flight, but if overtaken the pursued throws himself on his back, and opposes beak and claws to his pursuer, thus, time after time, beating off the attacker. So soon as the young of the raven are able to fly the parents put them through a course of training in these tactics, acting the *rôle* of the peregrine until efficiency is attained. "At first the young are stupid and clumsy, but they soon learn to avoid the onslaught by turning over and presenting their claws, or by rising high in the air."

Mr. J. H. OWEN, in *British Birds* for July, continues his record of observations made on the nesting habits of the sparrow-hawk. In the present section he describes the behaviour of the hen at the nest, bringing out some extremely interesting facts. Thus, for example, he remarks that when the young hatch she does not take the egg-shells to a distance and drop them, as so many other birds do, but eats them while she broods. Great attention is paid to the sanitation of the nest, the faeces of the very young birds being carefully gathered up, and either swallowed, or thrown clear of the nest by a jerk of the head. Later they are able to eject them over the edge of the nest, and so relieve the mother of this task. Until the young are from twelve to fourteen days old all the food is brought to the nest by the male, who is promptly and unmistakably informed if he displays an excess of zeal in this matter. There is one point on which the author fails to make himself clear. This concerns his statement that as incubation proceeds the hen sheds down about the nest until, at hatching time, it is flecked with down, which is removed very soon after the young are hatched. Is this down naturally moulted or pulled out? Why is it allowed to accumulate, since it serves to direct attention to the nest, and why is it later so carefully removed?

THE annual volume of the Kew Bulletin for the year 1915 has only just been published, although the concluding part was issued on December 24. Several articles of economic importance will be found in the 438 pages comprising the volume. In particular, one on the gemination of coconuts, from which it appears that nuts taken from young trees may safely be planted; another on the species of Sansevieria, the source of bowstring hemp, with numerous figures; and a third on Iburu and Fundi, two cereals from Upper Guinea, deserve particular notice. Of papers dealing with systematic botany, those on South African Santalacaceæ, the genus Meconopsis, new tropical African species of Ficus, and the genus Phelipea, a remarkable parasitic genus containing three species, are among the more important contributions.

IN the Memoirs of the Department of Agriculture in India, vol. vii., No 7, Mr. and Mrs. Howard and Mr. Khan contribute important papers on the Indian oil seeds, safflower and mustard. As in the Howards' earlier investigations into the economic plants of India, the various races have been collected and carefully studied at Pusa. Twenty-four types of safflower, *Carthamnus tinctorius*, L., have been isolated and separated on the characters afforded by leaves, bracts, flower-colour, and general habit. As a dye plant the safflower has only local importance, but it is interesting to find that some of the types which yield most dye also yield a high oil content in the seeds. Improvement by selection could be undertaken with ease as a result of the work done at Pusa, though it may not be an easy matter to establish a superior variety on a large scale. Not only may it be difficult to replace the country crop, but owing to the frequency of natural crossing in the plant, the deterioration of an improved variety would be very liable to take place.

SEVERAL important publications have been received from the Norwegian Meteorological Institute. The Jahrbuch for 1915 contains a summary of the meteorological observations of all the stations in Norway for the year 1915, including the station at Green Harbour, in Spitsbergen, which is maintained in that no man's land by the Norwegian Government. This station, in 78° 2′ N., is the most northerly permanent observatory in the world. The annual volume on the rainfall of Norway ("Nedboriagttagelser i Norge") gives the rainfall and snowfall for nearly 500 stations for the year 1915, and includes a large-scale rainfall map in two sheets. A further pamphlet ("Oversigt over luftens temperatur og nedboren i Norge i advet 1914") gives the monthly mean temperatures and the rainfall for Norwegian stations, with their departure from the normal, in 1914.

THE May number of the Proceedings of the Tokio Mathematico-Physical Society contains a paper on the silver voltameter, by Mr. J. Obata, of the Department of Communications. In accordance with the specifications of the London conference of 1908 and of the Washington committee of 1910, the kathode was one of three platinum bowls, and the anode a plate of silver. After deposition the deposit was transferred from the bowl to the silver by electrolysis. Acidity of the silver nitrate solution was found to produce a decrease in the deposit of rather more than four parts in a million for an acidity near the kathode of one part in a million. With the help of two ohm coils previously standardised by comparison with the mercury ohm, the electromotive force of the normal Weston cell was found to be 1·01827 international volts at 20° C. The author recommends for ordinary laboratory work a silver voltameter in which anode and kathode are strips of silver bent into cylindrical hoops, the one of greater diameter being the kathode, placed in a glass dish, with a shallow glass dish below the anode to catch any particles of silver detached from it during the experiment.

IN the development of the sugar industry the saccharimeter has been a noteworthy factor, because of the accuracy and simplicity with which, by its aid, sugar and sugar-products can be evaluated. Moreover, in recent years the instrument has been increasingly used for the purposes of general scientific research. It is therefore important that any questions regarding the accuracy of the fundamental constants of the apparatus, and of sugar polarimetry in general, should be critically examined, and any uncertainty respecting the basis of standardisation removed. In No. 268 of the "Scientific Papers" issued by the United States Bureau of Standards an account is given of investigations carried out with this object in view by Messrs. Bates and Jackson, who have studied the "constants" of the quartz-wedge saccharimeter and the specific rotation of sucrose. They find that pure sugar gives a reading of only 99·89° for the normal solution, instead of 100° as hitherto accepted. In other words, the "100° sugar point" was found to be rather more than one-tenth of 1 per cent. too high, thus making the proportion of sugar in specimens tested with the saccharimeter too low by this amount. The authors' result, if confirmed, is important, not only to producers of sugar, but to fiscal authorities, inasmuch as sugar is assessed for duty by means of the saccharimeter. The specific rotation of sucrose in solutions of normal concentration was found to be 66·529°, light of wave-length 5892·5 Å being used; this is a slightly higher value than that generally accepted, namely 66·502°.

IN view of the abnormally high price of petrol and the difficulty of obtaining it, an article in the *Engineer* for July 7 will be read with interest. The article is descriptive of the Binks vaporiser and carburettor, by use of which paraffin may be substituted for petrol in motor-driven vehicles. A small petrol tank is fitted for the supply of petrol for starting the engine; paraffin is employed after the vaporiser has become sufficiently hot. The carburettor has two float chambers, one for petrol and the other for paraffin, and has a main jet and two pilot jets. The sprayed paraffin enters the vaporiser, which consists of two concentric tubes, between which the exhaust gases from the engine pass, and thus heat the walls of the inner tube. The latter tube contains a worm which causes the mixed air and paraffin to whirl as the mixture traverses the inner tube. There is thus a tendency to throw any unvaporised paraffin into contact with the hot walls, where vaporisation is completed. With present prices, application of this and similar devices may reduce the cost of fuel for motor-engines by 50 per cent.

THE following books of science are to be found in Mr. John Murray's new list of forthcoming books:—"David Gill: Man and Astronomer," by Prof. G. Forbes; "Man as He Is," by Sir B. Fuller; "The Ages of Man," by C. Sayle; "What is Instinct? Some Thoughts on Telepathy and Subconsciousness in Animals," by C. B. Newland; "British Forestry: its Present Position and Outlook after the War," by E. P. Stebbing; "The Lost Cities of Ceylon," by G. E. Mitton, illustrated; "A Book-Lover's Holidays in the Open," by T. Roosevelt, illustrated; "Form and Function: a Contribution to the History of Animal Morphology," by E. S. Russell, illustrated; "Hunting Pygmies," by Dr. W. E. Geil, illustrated; "Vegetable Fibres," by Dr. E. Goulding (Imperial Institute Handbooks); and new editions of "Recent Progress in the Study of Variation, Heredity, and Evolution," by Dr. R. H. Lock, revised by Dr. L. Doncaster, with a Biographical Note by B. S. Woolf (Mrs. R. H. Lock); and "The Study of Animal Life," by Prof. J. A. Thomson, illustrated.